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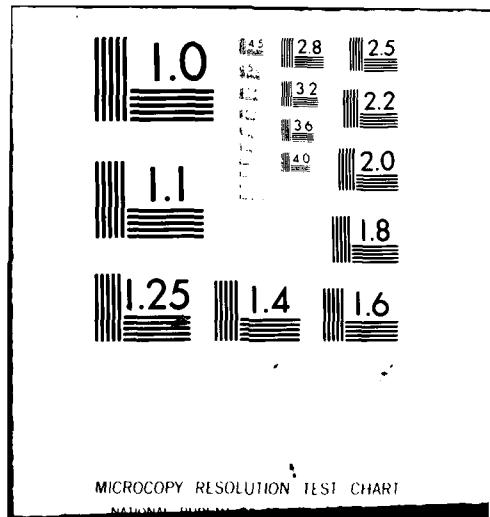
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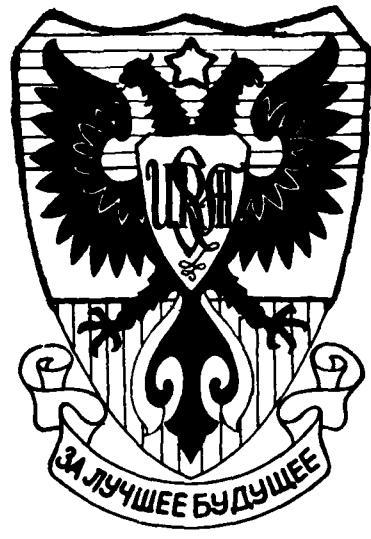


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## **STUDENT RESEARCH REPORT**

**SOVIET FRONTAL AVIATION  
CPT Gary Streb  
June 1980**

**GARMISCH, GERMANY**

**APO NEW YORK 09053**

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SOVIET FRONTAL AVIATION



CAPTAIN Gary Streb

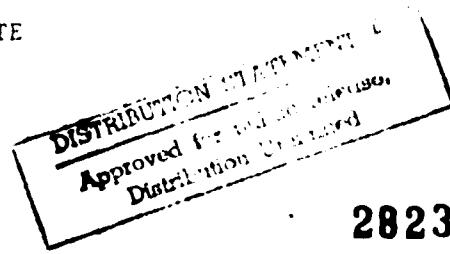
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F O R E W O R D

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SUMMARY

Frontal Aviation, an asset of the front-level combined arms commander, functions to support the ground troops. This paper examines the primary roles of Frontal Aviation as well as its organizational structure. "Model" aviation units are examined in order to evaluate the training effort. Problems are identified in the areas of close air support coordination and the rigidity of training requirements. This paper also presents a discussion of the evolution of fighter tactics since World War II. Tactics must change in order to accomodate the advantages of modern technology. A brief examination of current and near-future resources is presented. With ground force doctrine changing towards an emphasis on a highly mobile force contacting the enemy along a wide front of meeting engagements, Frontal Aviation has gained new importance and new roles, but unless some of the coordination problems discussed within this paper can be worked out much of these assets will be poorly utilized.

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## INTRODUCTION

The Armed Forces of the Soviet Union consist of five separate branches: Strategic Rocket Forces, Ground Forces, National Air Defense Forces (PVO), Air Forces, and the Navy. The missions of the PVO forces and the Navy demand that they both have their own organic air force. The Air Forces are divided into three main components: Frontal Aviation, similar to the US Tactical Air Command, is primarily concerned with theater operations and warfare; Long Range Aviation is the strategic bomber force, similar to the Strategic Air Command minus the ICBM responsibility; and Military Transport Aviation is the airlift capability for the armed forces.<sup>1</sup> Each of these air arms has operational functions and missions that occasionally overlap and are mutually supporting.

This paper will examine one component arm of the Soviet Air Forces, the tactical air force. Frontal Aviation (*frontovaya aviatsiya*) is the largest component of the Air Forces and is basically responsible for supporting the ground forces in combat areas, through both aerial combat and ground attack.<sup>2</sup> Frontal aviation assets are tasked with several missions that include supporting troops in the field by providing protection against enemy air strikes, destroying enemy capabilities on the battlefield and in his rear areas, conducting reconnaissance of both the battlefield and rear areas, and supporting air landing and assault operations.

The scope of this paper will be limited to an examination of the capabilities, resources, training procedures and tactics, and the evolution of the frontal aviation missions that most directly support the ground troops, i.e., aerial combat and ground attack (close air support). Aerial combat, in the Soviet view (*vozdushnyy boy*), is "combat activities by single aircraft or groups of aircraft combining fire and maneuver for the purpose of destroying enemy aircraft, their crews, and unmanned weapons in the air."<sup>3</sup> The Soviets view the ground attack mission (*Shturmovyye deystviya aviatsii*) as "an attack by aviation from a minimum distance and altitude (point blank), against optically visible land (or sea) targets, with the use of simple and complex types of maneuvers and various means of destruction."<sup>4</sup> This mission equates to the Western concept of close air support. The first concern of aviation forces is to attain and maintain aerial superiority. After this has been actuated and the enemy's means to strike decisively are reduced, then frontal aviation assets can be utilized to directly support ground troops. This differs from American concepts which foresee close air support as an integral part of the ground battle from the outset.

In order to examine frontal aviation tactics, their effectiveness, and their modernization in light of constant battlefield improvements and changing ground force doctrine, several aspects must be examined. Fighter tactics will be explained within current doctrine. A comparison will be made with the tactics of the Great Patriotic War and current doctrine. How pilots are trained and drilled within peacetime constraints will be examined. Also, an examination of current and replacement aircraft will be beneficial to analyze how viable frontal aviation forces will be in the future.

Much has been written in the Soviet open press about the lessons of the Great Patriotic War and the Soviets have given a share of the credit for the success of the socialist victory to the air support offered by frontal aviation assets. But missions, tactics, and resources have changed during the 35 years since the war, and accordingly, air support and air combat tactics have changed. Because the Soviets have not recently exercised their overall military organization in wartime, they are dependent upon realistic combat training to keep their tactical

air forces combat ready and alert. Therefore, an analysis of the training procedures is essential in order to evaluate the effectiveness of frontal aviation operations. In the long run the evaluation of the training process will be in actual combat; however, close analysis of training objectives, resource statistics, and propaganda-filled critiques of training exercises can lead to some important insights.

## MISSIONS AND ROLES OF FRONTAL AVIATION

The primary role of Frontal Aviation is to support the Ground Forces. Tactical air support in the roles of air defense, ground attack, reconnaissance, and electronic warfare are basic to this primary mission. An expanded mission is to strike theater nuclear forces and supplies and to strike enemy tactical air forces in order to attain air superiority. Achieving air superiority must be accomplished before frontal aviation aircraft are able to provide ground support. The National Air Defense Force is tasked with providing strategic defense of the borders, therefore, Frontal Aviation is tasked with the role of theater air defenses. Long Range Aviation is responsible for strategic, long range bombing, but frontal aviation assets may be tasked to augment this mission, particularly to eliminate theater nuclear threats. This paper will examine the missions of ground attack and air defense, only in regards to aerial combat as defined earlier.

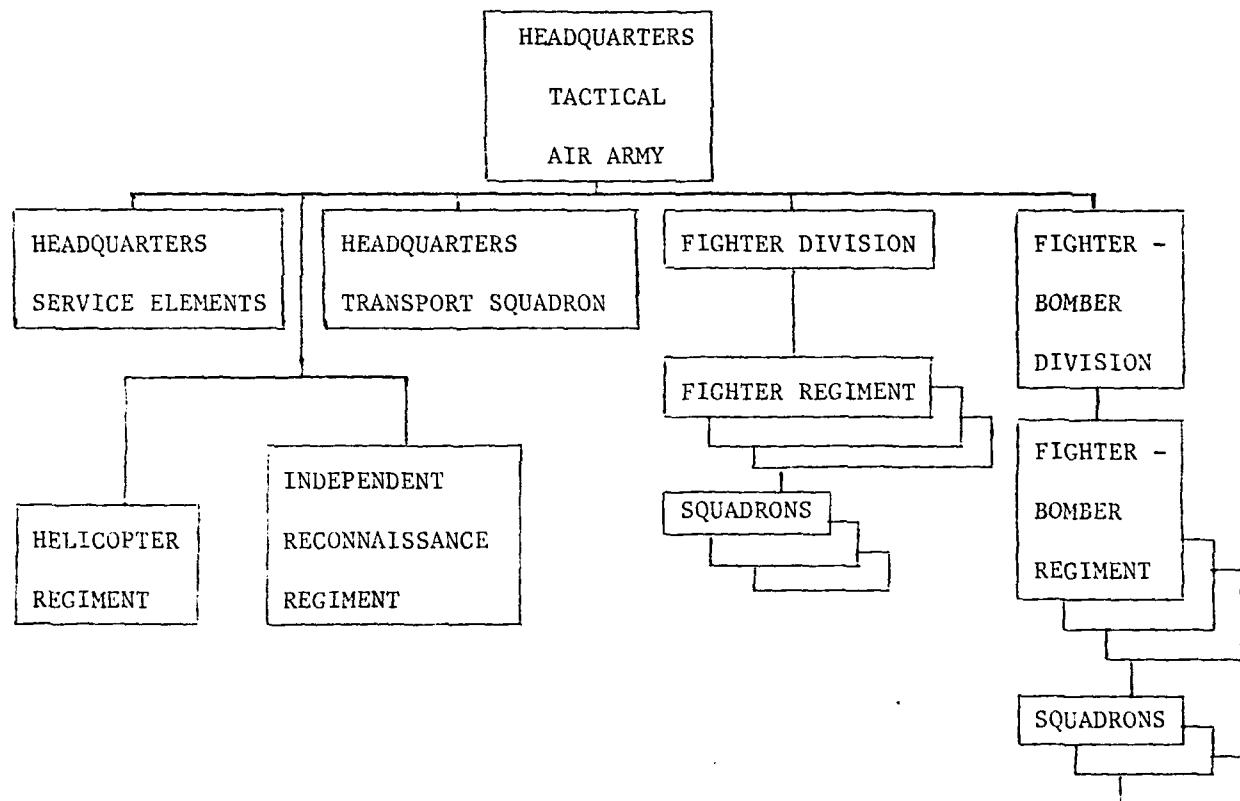
Tactical air support of ground operations can be broken down into the following missions: (a) gain and maintain air superiority within the area of operations, (b) restrict the movement of enemy troops, equipment, supplies, and reserves, (c) provide ground attack as close air support in ground operations, (d) provide helicopter transportation and support required for heliborne operations, and (e) provide air reconnaissance for the ground forces.<sup>5</sup> The other type of support presented in this paper is air defense and air combat support. Unit air defense is the "complex of combat operations of the various air defense forces and weapons at the disposal of strategic formations or major field forces of ground troops. (i.e., the air army assigned to the front), conducted for the purpose of repulsing strikes by enemy aviation and missile units against troops and their rear installations."<sup>6</sup> The maneuvers used to accomplish the air defense of ground troops is air combat as defined earlier. Air combat support involves the use of fighters/interceptors in support of other combat air missions; i.e., clearing the path for fighter-bombers and covering forces. This role denies specific areas of operation to the enemy so that friendly aircraft are protected. Air combat is essentially maneuvering in order to achieve air superiority, which is "having an air force whose capabilities are such to ensure a high level of activity and freedom of action during a definite period of time throughout the theater or in sectors."<sup>7</sup> These missions of ground attack/close air support and air combat are carried out at low and medium altitudes and are characterized by the importance of maneuverability rather than supersonic speed.<sup>8</sup> Attaining air superiority takes precedence over direct support of the ground troops.

Tactical air support that most closely aids the ground troops is battlefield interdiction which restricts the effectiveness of the enemy by reducing his fire-power. Targets for interdiction are mobile surface-to-surface missiles, ground force concentrations, and command and control centers. This mission requires that frontal aviation resources be able to operate well behind the front lines in order to attack the tactical reserves of the enemy. Massed air strikes are to be launched against missiles and air bases and nuclear supply installations. This mission envisions the necessity to breakthrough enemy air defenses and to destroy enemy air force capabilities while they are still on the ground. For this mission, airfields and storage areas will provide the most lucrative targets.

Other tactical missions include reconnaissance and electronic warfare. Reconnaissance at theater and tactical levels is conducted by all-weather capable frontal aviation aircraft that are equipped for visual, photographic, and electronic surveillance over the battlefield. Electronic warfare is the deception, blinding, or decoying of the enemy's radar surveillance equipment as well as fire control equipment for missiles and antiaircraft guns.<sup>9</sup> Organic assets are used to create false targets, block enemy radars, provide electronic air security and activate guidance equipment for bombing missions.

### ORGANIZATION AND OPERATIONAL COMMAND AND CONTROL

The frontal aviation assets are grouped into front-level tactical air armies. There is no standard organizational structure for the tactical air army but a typical deployment includes a combination of fighter regiments, fighter/bomber regiments, helicopter transport regiment, reconnaissance regiment, and supporting units. These supporting units consist of headquarters and staff personnel, signal units, radar units, maintenance units, and air defense and transport units. A typical tactical air army is organized as below:<sup>10</sup>



(A division may be composed of three or more, or less than three regiments.)

Generally the tactical air army is organized into a triangular, hierarchical system; i.e., each air army may consist of three divisions, each division consists of three regiments, each regiment with three squadrons, and each squadron with three flights (tactical subunit--otryad). The number of regiments within a tactical air army may vary in order to meet specific operational situations. There are currently 16 air armies deployed, one in each of twelve military districts within the Soviet Union and four in the groups of Soviet forces in Eastern Europe.<sup>11</sup>

The air regiment is the basic administrative and tactical unit. Like the air army, it can vary according to size, number of subordinate units, and mission. The squadron is the basic combat fighting formation and unit.<sup>12</sup> The number of aircraft assigned at each level also varies, but generally the following apply: flight (otryad) consists of 4 aircraft, squadron 12, regiment 36, and the division 108. The tactical air army, shown as typical, therefore, consists of approximately 300 combat aircraft.

During peacetime frontal aviation assets in the form of the various air armies are under the administrative control of the Air Force Headquarters and the Commander-in-Chief of the Air Forces, Chief Marshal of Aviation P. Kutakhov. However, operational control is exercised by military district commanders and the commanders of the groups of forces outside the Soviet Union.<sup>13</sup> Therefore, frontal aviation resources are actually in the hands of the ground force/combined arms commander. During war, with the activation of the front as a military unit, the front commander will have operational control of the frontal aviation air armies which involves targeting and strike priorities. The air army commander retains direct control of air operations but he serves on the front staff as aviation deputy.<sup>14</sup> In wartime the front will consist of at least two ground armies, and the front commander will set up his command post near one of the armies. The air army commander, as the aviation deputy to the front commander, will set up his command post in the same vicinity. After the front commander receives his instructions from the High Command, he coordinates with the air army commander and assigns specific operational responsibilities to the air units. During this time the following are decided: type and degree of air support for each phase of the operation; priorities for execution of air missions; areas and sectors to be covered by reconnaissance; amount and type of support to be provided by the air army and by ground units operating outside the main effort zone; and the amount of support ground forces will offer the air army.<sup>15</sup>

Liaison officers are assigned from the tactical air army down to the ground division level. These liaison officers aid the ground commander and are involved in (a) the preparation of fire plans, which include both artillery and air targets, (b) preparation of air defense plans, and (c) arranging passage of friendly aircraft through their own air defenses.<sup>16</sup> The Soviets define this liaison officer as a "senior air force officer sent from the air army to a combined arms or tank army to organize and maintain coordination with the troops."<sup>17</sup> It appears that the air liaison officer is involved with aiding the commander in the planning stages rather than aiding in the control of aircraft as they execute their missions.

Requests for tactical air support can be made by the tactical ground force unit (regimental level through division) to the army headquarters whereupon the liaison officer from the tactical air army will work it into the flight plans of the supporting aircraft that belong to the tactical air army. Ground armies may be allocated a number of pre-planned sorties which in turn can be allocated down to the divisions. The lower-level ground commander, unlike his American counterpart, is restricted to the pre-planned sorties determined at army level since there are no forward ground based air controllers to allow for changes in targets

over the battlefield.<sup>18</sup> The liaison officers act as advisors in the planning process rather than as forward air controllers. This missing link between the aircraft and troops in the field results in utilization of pre-planned flight patterns rather than immediate target-sensitive requests. Ground support/close air support demands exact coordination in order to avoid bombing friendly units and therefore, most of the Soviet support is pre-planned and rehearsed rather than lending itself to the flexibility needed in a fluid combat situation. This lack of aircraft control by the ground elements will be shown in the training discussion of this paper as a definite flaw in the command and control system of the tactical air support system.

## TRAINING

Constant reference to Marxist-Leninist goals and defense of the Motherland abounds in the open Soviet press when addressing pilot and air combat training, but it is not simply superfluous propaganda. It is not only the "sacred duty" but also a constitutional responsibility (Article 31 of the Constitution of the USSR) for the Armed Forces to be in constant combat readiness and to guarantee an immediate repulse to any aggressor. The high combat readiness demanded of Soviet Frontal Aviation necessitates extensive training in peacetime. Marshal Kutakhov stressed that improving combat readiness requires of all air force personnel the constant reinforcement of knowledge, the ability to master combat equipment, and the method of using it to the point of perfection, as well as the intensification of the struggle for high effectiveness and quality in combat and political training.<sup>19</sup> The higher the quality of combat training, the higher will be the essential combat readiness. Training must be as realistic as possible.

The most important field of training of the Armed Forces is direct training of troops in methods of conducting combat operations, which includes operational, combat, and political training. In addition to maintaining the high level of combat readiness of the armies, the basic aims of these types of training are: the mastery of the means of armed fighting; teaching methods of fighting a battle, an operation, and armed combat as a whole; the development and verification of new methods of waging combat operations; the verification of the workability of the plans and calculations for wartime; and the political and military training of the personnel.<sup>20</sup>

Basic Soviet pedagogy demands that the Soviet soldier be trained in near combat conditions which are always merged with political indoctrination. This constant communist rhetoric is an integral part of the training process. The trainee has had this methodology of constant reference to the glory of communism ingrained in his thinking si ce kindergarten.

In order to analyze the effectiveness of combat training and the resulting combat readiness of frontal aviation forces, the training cycle needs examination. The training of the Soviet pilot begins with the selection for attendance to one of the officer candidate schools that are run by the Air Force. Cadets programmed to become pilots begin their pilot training at these officer candidate schools and graduate with both a commission and pilot wings.<sup>21</sup> After basic pilot training at an officer-producing academy, the new lieutenant is assigned to an air squadron where his specialized training continues. The new pilot must merge into the activities of the unit immediately. "The professional training of the young officers must not interfere with the habitual life of the squadron: combat alert duty must be performed, the training levels of experienced flyers must be maintained."<sup>22</sup> The Soviets emphasize that the commander is the "organizer of training and education for his subordinates and the timely and qualitative resolution of combat training depends upon his high degree of comprehensive training."<sup>23</sup> The commander must understand the requirements for training and the educational level of his subordinates. The commander must find the most effective methods of training and education in order to ensure that the necessary moral and combat qualities of the young pilots develop according to the set qualities and schedules established by higher headquarters.<sup>24</sup>

Basically the commander must view each new case individually and tailor a program to fit the new pilot's needs in order to quickly have him combat proficient

and able to merge into the squadron. Innovative ideas for continued improvement of the quality and speed of training are frequently written about in the open press, but they are usually tied in with a critique of actual training situations. Rather than listing inflexible rules to be followed in every case, these "case study" aviation units interject suggestions to other units in the field on how to improve their training procedures.

One such model unit, a fighter squadron, will be utilized in this paper to describe the training procedures deemed necessary to train new pilots in low-level aerial combat techniques. In order to effectively support ground troops either by interdiction of enemy ground targets or by air combat/interception of enemy aircraft, the pilot must be thoroughly familiar with intercept and air combat techniques at low altitudes. This is particularly important in close air support. It has been estimated that almost 80% of the time spent in flight training is low altitude flight exercises and all weather operations.<sup>25</sup> Special features distinguish this form of flying from other flying missions, as is characterized by the nearness to the ground and, therefore, the pilot's emotional-psychological load increases.<sup>26</sup> Fatigue sets in more quickly. Due to this nearness to the earth, the fighter aircraft's maneuver capabilities are limited, especially during group flight. The opportunity for ground visual orientation is hindered while at the same time, the range to detect targets and the time to observe them is decreased. The pilot needs special traits to effectively accomplish these low altitude missions. He must learn his own aircraft and its organic weaponry by heart, know flying techniques perfectly, know the tactics of his own and enemy aviation, possess the traits of will, courage, steadfastness, and be ready to sacrifice his life for the sake of the socialist victory.<sup>27</sup> A comprehensive training program has been developed by the following "model" fighter squadron to instill such traits into their fighter pilots.

The training cycle involves initial staff planning, on-the-ground lectures, modelling, flight simulators, and finally, in-flight exercises. First, the commander, the political affairs section, and Party and Komsomol activists devote time and attention to moral-political and psychological training. Scheduled lessons, lectures, and discussions are prepared extensively on the ground. Experienced active duty pilots, guest lecturers and veterans of the Great Patriotic War relate their experiences. Next the commander must be reassured that the new pilot has fully mastered flying skills in flight training school and can operate the radar, control surfaces, and weapon systems faultlessly. Only after this checkout is the pilot able to continue to combat qualification flights. The Soviet program apparently allows the squadron commander to select the most suitable method for each individual pilot. Individual high quality depends upon correct training methodology.

The "model" training cycle begins after basic flight tests have been completed. The aviation unit's council on training methodology is then assembled to give the commander the necessary information on the qualifications of the new pilots. In this case study, the council made the recommendation that a uniform method of instruction be developed, obviously due to the similarity in the expertise of the new pilot group.<sup>28</sup> A special instructor group was selected. Training materials were developed based on actual low-level intercept flights conducted by this experienced instructor group. Photographs taken from the ground of the flight in progress, and monitoring and recording data taken by the ground control party were carefully analyzed and transferred onto large-scale training aids. This probably consisted of a step-by-step schematic of the aircraft's positions along the entire flight path and the techniques of aerial combat along with the controller's commands. Possible variants were added to the actual flight results. These results and variants were first studied by the flight commanders, instructor pilots, and the ground control intercept (GCI) controllers. Then the pilots studied the training aids with

the actual results, schematics, and possible variants during individual training discussions. It appears from this squadron's experience that ground control personnel are actively involved with the pre-flight training of the pilots.<sup>29</sup>

After pictorial and graphic study of the intercept missions, the next step in the cycle is the flight simulator class conducted by the flight (otryad) commander. While conducting "intercepts" on the simulator, each flight commander follows an individually paced program for each pilot and is required to annotate and critique each mistake his student makes. After the simulators the pilots move to the actual aircraft, where they work with the on-board systems until they reach "conscious automation" mastery. They become so used to the aircraft that maneuvers and manipulation of controls will be an automatic response during the anticipated tenseness of actual combat. Throughout the cycle more classroom instruction is provided by the commander and the Party activists to further tactical training. Combat training plans are used so that the pilot is constantly instilled with the ability to first analyze the probable enemy's combat capabilities and his tactics, identify the weak and strong points, and secondly to find the most effective methods of combating him.<sup>30</sup>

"Dismounted flight training" is next. This method is usually conducted on a special field where the training flight area is outlined in miniature scale. Different variants of aerial combat are "walked through", usually involving plastic aircraft models carried by the pilot as they walk over the miniature course on the ground. One pilot walks along the pre-planned flight path approaching his target while another pilot performs low altitude intercept against him with their models in hand. The Soviets justify this dismounted flight training method because they feel that the pilot will later have a clear picture of where to look for his target and what he must do to maneuver correctly, attack, and destroy enemy aircraft.<sup>31</sup> The utility of such a training vehicle may initially be questioned by many Western observers. But the Soviets use this expanded sandbox extensively in their training exercises. It forces the pilot to become familiar with his flight path and to recognize points on a life-like terrain model rather than printed maps.

After the ground preparation is complete the pilot is then ready for his qualification flight in low altitude intercept tactics. During the pilot's first basic qualification flight he learns, with the help of the command post team, to employ the entire system of his aircraft's weaponry under simulated combat conditions. In this particular case study the squadron commander found it advantageous to arrange the first low-level qualification flight so that the pilot must visually search for his targets since the successful fighter pilot does not rely solely on his radar instrumentation or CP directives but can visually sight and surprise his target. Critique of the flight is immediate. After the flight the pilot is further aided by more experienced flyers to correct any navigation errors. With additional flights, the new pilots gain experience and confidence.

Besides the advice of fellow aviators, active training of pilots is enhanced by a close working relationship between the pilot and his ground control command post. The CP is a combat unit that includes aircraft control officers, operators, and plotters. Although radar guidance proves most reliable, the Soviets consider it more advantageous to control air combat by radio and in order to do this the CP operators must be proficient in the tactics and capabilities of both friendly and enemy aircraft, the pilot's training standards, and the air combat tactics previously practiced. Teamwork, therefore, is an essential element to the success of this endeavor.<sup>32</sup> During peacetime the effectiveness of this teamwork can be analyzed in the study of the tactical flying exercises. Tactical flying

exercises are an important check of the pilot's skill to utilize the aircraft's weaponry as well as the tactical skills of the combat airman. During exercises that attempt to approximate combat conditions to the maximum, pilots learn to interact with subunits of the ground forces and resolve many problems that arise during combat actions. Close communication is maintained with the control command post. But the actual accomplishment of successful live firing exercises with troops is due to detailed pre-planning and depends upon everything going according to the schedule. When unforeseen circumstances arise, rather than change the mission parameters on the spot through communications between the CP and the aircraft, the mission will be suspended and critiqued later.<sup>33</sup>

Again the case study analysis may prove helpful to study the effect and utilization of large-scale training exercises. One account of the large-scale "Berezina" training exercise in 1978 was written by Lieutenant General of the Air Force Bazanov.<sup>34</sup> One of the exercise objectives was to test the coordination between the Ground Forces and Air Forces. Bazanov stressed that the modern combined arms battle has become exceptionally fast and dynamic due to the possession of high-speed, cross-country, maneuverable vehicles and weapons. Successful operations can be achieved only if close cooperation between the ground and air elements is initiated at the decisive moment and place. Bazanov praised aviation assets for this cooperation:

Owing to the immeasurably increased firepower of present day aircraft and helicopters as compared with the time of the Great Patriotic War, air-ground cooperation must be more purposeful and coordinated as regards time and space and be characterized by perfect, mutual identification and target designation.

In preparing for the exercise, the air unit commander and representatives of the land forces jointly worked up their cooperation and modelled different variants of attacks on air and ground targets acting by various groups and in various formations. Much attention was paid to the airman's moral and psychological readiness to cope with the set mission in conditions close to reality.<sup>35</sup>

Personal contacts between air and ground commanders were instrumental in the success of the exercise. There was no mention of permanently assigned liaison personnel from the tactical air army who would act in the role of forward air controllers while the aircraft were executing their close air support. There are officers from the air army attached who act as advisors to the ground commander in the planning stages but they do not have an active role in the control of aircraft during flight. Hence the possibility of executing immediate requests, demanded by requirements on the dynamic battlefield, is non-existent. Bazanov stressed that the success of the exercise was attributed to the aircraft being at the right place at the right time according to the pre-planned scheduled series of events. If this is the rule, the Soviets are surrendering valuable air resources for the sake of pre-planned precision. Being able to divert an aircraft to new targets while in flight or to establish new mission parameters for available stand-by aircraft would add greatly to the close air support capability. Bazanov concluded his critique by crediting the success of this exercise to the carefully pre-planned activities of the aircraft crew and the cooperation between the air and ground elements. The punctuality in approaching the target and executing the mission was credited as the decisive factor. He gave the impression that training was totally pre-planned and scheduled, although some targets of

opportunity were eliminated along the flight route by pilot initiative.

But this coordination between air and ground elements must not be planned to the point of inflexibility or else training and future combat actions will be a failure. Another exercise was examined more critically:

Coordination between ground forces and aviation requires exceptional precision and diligent agreement on the target times and lines. Here the significance of regulatory documents--the schedule of operations of ground-based subunits and flight plans cannot be over-emphasized. But do the documents worked out prior to initiation of combat missions rule out flexibility in organizing coordination or introducing changes in its structure as required by the actual evolving situation? Coordination devoid of flexibility cannot be sufficiently effective.<sup>36</sup>

During this smaller-scale exercise it was noted that no thought was given to making corrections to the pre-planned flight plans. The ground commanders never called for air support unless it was envisioned beforehand. The ground commanders did not have an in-depth knowledge of aviation capabilities nor did the pilots judge ground developments accurately. Regulatory documents, schedules, and safety procedures are important, but coordination and flexibility must be added to the exercises or else pilots will not function properly under real combat conditions. Additionally, duplication of artillery targets and close air support targets was condemned. The introduction of new equipment has made this duplication of effort more frequent. The mobility of the new series of self-propelled artillery guns and the expanded use of the helicopter gunship in close air support may frequently result in dual coverage of the same target. A lack of coordination between these two strike forces tends to diminish the overall effectiveness of each.

In discussions with exercise participants it was revealed that each worked by his own rules, his own plans, exclusive of others, and often unaware of the needs of the supported unit.<sup>37</sup> Self-criticism of this sort, however subtle, indicates that perhaps this is a pressing problem within the close air support function of the frontal aviation forces. If the ground unit cannot request new missions or change mission parameters or direct the aircraft from the ground, the supporting aviation assets will not provide the best support that it is capable of giving. Working according to plan cannot always work in war. Communication between the low-level (battalion and below) ground commander and the airborne support aircraft, through a forward air controller would alleviate this coordination gap.

The true test of training procedures is not a series of staged training exercises, but actual combat. The Soviets have not had the recent experience of a combined ground and air war. Limited Soviet resources and personnel may have been used in foreign local wars, but large-scale deployment of Soviet forces has not allowed an observation of their actual working relationship. In light of a peace-time posture, the Soviets view combat readiness as a test of training proficiency.

"The combat readiness of the air forces includes the ability of the air units, upon signal, to be ready to act quickly and to successfully carry out combat missions, utilizing all modern weapons, at any time, under any weather conditions and with maximum intensity."<sup>38</sup> It is characterized by the speed in which units

are made ready for takeoff and by their actual combat abilities, that is, the abilities of both the aircraft crews and the hardware. The burden of combat readiness seems to be placed upon the individual, his military and political training, and his actual performance. To a significant degree combat readiness is also determined by the qualitative condition of the aviation resources. With the introduction of new complex aircraft, communications, navigational aids and control systems, a high degree of combat readiness can be maintained only if the aviation unit commander can quickly and effectively retrain his personnel. The training cycle is this important link between the pilot, his aircraft, and a constant state of high combat readiness.

The combat skills of flight personnel are one of the most important components of combat readiness. Additionally, there must be a close working relationship between the pilot and support crews. Combat readiness and "the fighting efficiency of units is characterized not simply by the number of flight personnel trained for flights under given conditions, but rather by the number of crews able to successfully carry out the specific combat mission."<sup>39</sup> The mastery of combat skills and testing of this relationship between pilots and support crews center around actual tactical flights and exercises conducted under near-combat conditions. Tactical training exercises are considered essential to maintaining readiness. The Soviets stress the fact that they use the lessons of the Great Patriotic War and training lessons, led by the most experienced pilots, as an integral part of their training. Veterans explain that they were victorious only because of the mastery of their equipment, the use of established tactics, as well as the use of unproven and often illogical maneuvers.<sup>40</sup>

The commander of the aviation squadron emerges as paramount in the training process and ultimately in the Party's demand for a high state of combat readiness. The commander is expected to be in the air, teaching his new pilots by example. But training alone is not the only prerequisite to combat readiness. The commander and his staff must constantly control all aspects of training as well as the ideological and psychological upbringing of his personnel. The supply and maintenance of the aircraft and aviation units, as well as the maintenance of the airfields and physical facilities is extremely important to combat readiness and thus the efficiency of the aviation forces.<sup>41</sup>

## TACTICS: HISTORICAL ANALYSIS AND CONTEMPORARY APPLICATION

The tactics used within Frontal Aviation are dependent upon the type mission that the aircraft are tasked to execute. Close air support tactics bear no resemblance to aerial combat maneuvers although the same type aircraft and same pilot may engage in both missions. Many of the Soviet aircraft have this dual role capability--ground attack as well as fighter escort or interceptor. To examine how contemporary tactics have evolved an historical analysis is helpful. The Soviets are still deeply influenced by their World War II experiences and use these in their current thought and training.

Fighter tactics during the Great Patriotic War were dependent upon the missions given. When providing cover for ground troops (air defense), the fighters were primarily deployed against enemy bombers and reconnaissance planes. The methods of providing cover were air patrolling and ground alerts. Air patrolling involved groups of fighters (2-16) assigned to a definite zone for the purpose of preventing enemy air attacks on ground targets.<sup>42</sup> The zone was usually a 15-20 km square with the number of aircraft dependent upon enemy activity, size of the zone, weather and friendly resources. They were tasked with providing continuous air cover and were constantly airborne. A more economical method was ground alert. Two or three planes would be launched as soon as approaching enemy aircraft were reported. Scramble time, the lag time between first alert of enemy aircraft and successful executions of launching friendly assets, was a liability in the ground alert method. A combination of both methods was used. Some aircraft were constantly airborne while the detailed fighters were on alert. Immediate response could be initiated by the air patrol supplemented shortly thereafter by the remainder of the alert planes. Fighters were also used in ambush tactics by positioning groups of fighters on the ground along probable enemy avenues of approach.<sup>43</sup>

In flight, formations were utilized to ensure effective control, good group maneuverability for the search for targets, surprise in the attack, and mutual fire and protection. The two-plane element (otryad) formed the basis of combat formations. The two-plane otryad was utilized to form the line abreast (100-150 m apart with 10-50 m distance), echelon (30-70 m apart with 50-100 m distance), and "V" formations.<sup>44</sup> Larger units (squadrons and regiments) flew in group formations when conducting their combat missions, with the two-plane flight forming the basis.

When supporting ground troops the unit formation was subdivided according to different roles into strike, cover, and reserve functions. The strike group was responsible for target destruction, while the cover force protected the strike group from air attack. The reserve group kept the cover group informed of the air situation by flying behind and higher than the cover group. It reinforced either the strike group or the cover force or both when necessary. The main means of control between aircraft was the radio. The personal example of the commander played a big role in ensuring communication and control. Routinely airborne, he kept his subordinates abreast of the situation, organized repeated attacks, and rectified pilot errors by in-flight corrections.

Surprise was of extreme importance and the attack was the decisive element of combat. On cover missions, the fighters would usually arrive before the strike force in order to drive enemy aircraft from the area. This gave the fighters escorting the bomber strike force better opportunities to maneuver and concentrate their activities in a selected zone. In missions to destroy ground targets, the fighters would fly in echelon formation and seldom launch concentrated attacks.<sup>45</sup>

In attacking enemy transportation lines the routine tactic was to abandon the echelon formation in favor of independent aircraft (freelance) operations, but still a strike group was formed to conduct the operation and a cover group to protect them.

Frontal aviation forces had other missions besides ground support and fighter interception. An important one was that of air supremacy. The Soviets define air supremacy (*gospodstvo v vozdukhe*) as "an advantageous situation (possession of the initiative) in the air, enabling friendly ground, naval, and air forces to complete the missions confronting them."<sup>46</sup> "The main mission of the Soviet Air Force during the Great Patriotic War was the struggle for air supremacy. Depending upon the objectives and the amount of forces and weapons available, this struggle was conducted on a strategic, operational, or tactical scale."<sup>47</sup> Strategic air supremacy was attained when complete Soviet initiatives were possible, by routing the main Nazi German forces. Operational supremacy was accomplished when Soviet forces were able to seek the initiative free from Nazi air interference along main lines of advance to secure front operations. And attaining tactical supremacy allowed combat units below front to secure their assigned missions. The task to neutralize or dislodge enemy aircraft from a certain area for a certain period of time, or to attain air superiority, was given to both Frontal Aviation and PVO.

During the war two methods of gaining air supremacy were used. Destruction of enemy aircraft was accomplished either in air combat or on the ground. Even though the attack on airfields was more economical, the main method of attaining supremacy was the destruction of enemy aviation in aerial combat because the aircraft damaged from above and the airfields were quickly rehabilitated.<sup>48</sup> The leading role went to the fighter pilot who provided cover and support to ground forces by destroying enemy aircraft in the air. Aviation units were given zones of responsibility which necessitated the reorganization of aviation assets similar to today's organizations. The squadrons and regiments were divided into several combat group: striking, covering, and reserve forces. The strike force was the bomber force, the covering force provided escort protection, and the reserve augmented either or both of the groups. Thus, air combat became a group effort with an emphasis on aircraft group formations rather than individual dogfights.<sup>49</sup>

During the war the role of Frontal Aviation was primarily directed to gaining air supremacy, as well as bomber missions, and conducting air combat/intercept missions. Little direct support to the troops on the ground was provided with the exception of providing continuous air cover (air defense). Even today doctrine calls for air superiority before ground support missions will be executed. The Soviets consider the term "air supremacy" as historical and now use "air superiority" (*prevoskhodstvo v vozdukhe*) for the same conditions. Frontal bomber aviation carried out the following tasks: neutralization and destruction of enemy manpower and equipment on the battlefield, prevention of reinforcement by enemy reserves, disruption of operational transport, disorganization of combat control and logistics, and destruction of enemy aircraft on airfields.<sup>50</sup> The majority of these sorties were flown against objectives up to 50 km behind the front line. The small depth of operation was common because the enemy concentrated his ground forces primarily in the front tactical zone, allowing only small forces for a reserve. Concentrated attacks involved the use of bombers and fighters together to form a strike force that was effective against ground targets and was unable to protect itself. Quite often whole regiments participated in these efforts. The aircraft would fly in wedge formation and deploy to echelon or column within the target area. In order to overcome enemy air defense aircraft, the Soviets

flew over the front line in inactive sectors only, and bypassed lines of communication, built-up areas and airfields that the enemy would be securing.<sup>51</sup>

The foundations of many of the current training procedures also originated in the war experience. The "dismounted flight training" method required the pilot to rehearse his flight patterns and aerial maneuvers on the ground by walking over a mock-up of the target area. On his walk-through he would discuss with other pilots presumed actions to be taken in air defense related maneuvers and variants to his flight patterns. But tactics could not be taught only on the ground. Air rehearsals were essential for successful mission accomplishment. Before a mission was executed a thorough reconnaissance was performed which involved visual observation and photography. The target mock-ups were created with the help of reconnaissance products. The experience of rehearsals during the war presented the Soviets with several training procedures they utilize today. These include: modelling method, graphic or physical reproduction in miniature of the strike area as confirmed by reconnaissance, rehearsal on dummy targets, the use of bombing ranges and practice bombing runs, and the use of all these methods to select several variants of the proposed mission.<sup>52</sup> The continued analysis of World War II fighter tactics shows that the experience of frontal aviation interceptor and ground support aircraft has not lost its significance, but rather it is used as a step in the evolution to contemporary tactics.

The lessons of the Great Patriotic War continue to be taught to the fighter pilots who belong to a new and vastly different air force. The tactics used in air combat 20 years ago may not be valid in today's environment. In a series of articles entitled "How has air combat changed?", Colonel V. Dubrov has challenged air combat tactics used traditionally by the Soviets. He extensively utilized the experiences of foreign press accounts in recent local wars and the writings, doctrine, and tactics of foreign powers. By using the words of foreign experts he could suggest improvements to current Soviet tactics without being overly critical.

The influence of new equipment and armaments has touched all areas of tactics. Increased speeds and, thus, increased turn radii expanded the spatial framework. Combat control had to be revised. A lesser reliance upon combat formations impacts on organization and coordination. The development of guided missiles led to an increase in attack potential and enhancement of the role of fire over maneuver. Radar made it possible to destroy targets beyond visual limitations. The mission of countering enemy radar is assigned to electronic countermeasures and is not firmly entered into combat tactics.<sup>53</sup> The Soviets often shallowly disguise discussion of their own tactics and equipment under the umbrella of "according to foreign press or sources." Colonel Dubrov has attempted to view changing Soviet tactics using this ploy and it is often obvious to the reader that he is in fact criticizing current tactics and suggesting changes and revision. His analysis is beneficial to the foreign reader in order to gain an understanding of current Soviet air combat tactics and methodology.

The "How has air combat changed?" series examined the roles of fighter tactics from the five stages of development. These are (1) search, (2) closing, (3) attack, (4) maneuver, and (5) disengagement. With the introduction of new supersonic aircraft, "search, the first stage of deployment, has been introduced as a new phenomenon. It is further divided into detection and identification functions. The Soviets had considered closing with the enemy to be the first stage but even they are willing to admit that the "first to spot the enemy wins!"

It is necessary to spot an attacker as soon as possible in order to undertake defensive actions. The need to rely upon organic radar acquisition means is

essential. The increase in ground radar capabilities has greatly aided the pilot. The command post has invaded the air combat area and influences the mode of conduct of target sighting. Even before a pilot can spot his target, the ground team can give a target allocation on the basis of analysis of the air situation and can suggest closing-in variants.<sup>54</sup> Ground and air control facilities aid the pilot beyond his organic radar capabilities and relay their findings, analysis, and recommendations by radio.

Changes have taken place in the realm of target search. The responsibility for the outcome of combat has been evenly divided between the pilot and the ground control facilities as airborne search and ground identification friend or foe (IFF) equipment possess different capabilities and both are essential.<sup>55</sup> Modes of conduct of search are different over friendly territory than in enemy airspace. Over friendly areas fighters usually provide cover or close air support for the ground troops and are monitored by friendly radars. This is complicated when entering enemy airspace due to the limits of the on-board radar systems. Intensive jamming can render them useless. Fighters should continue to maintain formation tactics and flight conditions, dependent upon the situation. Under such circumstances information could be received or visual sighting made but could not be exploited because of the lack of group combat. Visual search has been restored as an important method of target location. Defensively it is essential, regardless of the on-board radars.<sup>56</sup> Visual search continues to be important.

The second stage, closing, based on World War II tactics involved the maneuvers executed from the moment an enemy was detected to the time when it was most advantageous to attack.<sup>57</sup> The basic principles of the closing stage are concealment and speed. They have retained their importance but the methods of taking an advantageous position has changed. The speed of the aircraft has increased while the possibility for concealment has decreased. If the fighter's radar can see further than his adversary's, and the aircraft has better acceleration, success in the second stage increases. Concealment is a set of measures designed to deprive the adversary from obtaining accurate data on the air situation. Concealed maneuver is achieved only if the maneuver is non-standard and forces the enemy to solve unfamiliar problems. The closing stage can be characterized by the following principles: (a) the foundation is laid when the enemy is found and identified quickly and accurately; (b) successful closing is dependent upon friendly aircraft capability (speed and maneuverability) vis-a-vis enemy aircraft; and (c) closing is dependent upon quality of the equipment and the pilot's skill to use it advantageously.<sup>58</sup>

The third stage of deployment in fighter tactics, the attack, consisted in the Great Patriotic War of direct fire on the enemy and was the decisive stage of combat. It included rough aiming, precise aiming of the fire weapons, and the delivery of fire for effect. Careful preparation occurred in the earlier closing stage.<sup>59</sup> The elements of surprise and the attempt to down the enemy aircraft on the first pass became fundamental principles of the attack stage. It has become more difficult to attain surprise but the consequences are more severe with the use of supersonic aircraft. Colonel Dubrov in his continuing discussion of how combat tactics have changed, has reached several conclusions about the role of attack based on foreign experiences.<sup>60</sup> Tactics are now formulated to allow aircraft and weapons designed for interception to conduct multi-aircraft maneuver combat. The attack group no longer seeks to reach a high altitude prior to engaging the enemy but now stays low, in order to avoid detection by enemy radar. Due to increased weapon accuracy, there is no longer an emphasis on concentration of fire, but rather the emphasis has shifted to accuracy of fire. And lastly, thorough ground preparation and aircrew briefings are considered essential to execute the decisive stage of aerial combat.

The fourth stage of aerial combat is the engagement, which involves rapid change in heading and altitude after the attack has been made, a sequence of maneuvers at rapid rate, and devastating fire at close range.<sup>61</sup> It is basically close maneuver combat between supersonic fighters. Again, Dubrov has observed foreign experiences. He feels that the present engagement philosophy differs little from the Great Patriotic War, and therefore, the old standards hold fast. Close maneuver is acknowledged as defensive and enables one to seize the initiative, equalize change, or restore lost equilibrium. When pilot skills and aircraft capabilities are fairly equal, the pilot's flexibility or unexpected maneuver is the key factor to success. Traditional flight and fire training continue to be considered successful. There is still the need for highly refined flying ability, high tolerance to atmospheric pressures, spatial orientation, and armed fire at close range.<sup>62</sup>

The fifth and final stage is disengagement. Two options were traditionally established: free and forced disengagement. Free disengagement was exercised when the mission was accomplished. The forced disengagement was dictated by an inability to continue due to fuel shortage, pilot condition, or aircraft damage. Supersonic aircraft are given two basic tactics to disengage: maneuver to the blind zone in the enemy's visibility or total separation from the enemy. Due to the parameters of speed, altitude, and time, the substance of these tactics has changed.<sup>63</sup>

These five stages of aerial combat that the individual fighter pilot must execute do not exist in a vacuum. These stages describe individual maneuvers and tactics but aerial combat is still conducted within group formations. Coordination is essential to air combat in formation. A thorough, timely development of a plan, which organizes a pilot's correct understanding of his role in combat and a developed sense of collectivism is the legacy of the Great Patriotic War. Traditional tactics testify to the fact that combat formations demanded skills and cohesion from the individual sub-elements. They would not break up under any circumstance and visual contact and fire coordination were strictly maintained.<sup>64</sup> The Soviets still view the combat formation as critical to effective coordination and control. Dubrov points out that the failure of American pilots to stay in formation during the Vietnam conflict resulted in a lack of control and coordination. The pilot became only an individual rather than seeking safety in numbers. Due to the speed and maneuverability of aircraft, constant visual contact is no longer possible.

The above discussion illustrates that aerial combat has indeed changed since the Great Patriotic War. But some principles are timeless in their application. Fire and maneuver occupy a critical place in air combat and attainment of victory. Maneuver secures surprise and creates normal conditions for approach, sightings, and delivery of fire. Fire destroys the target. During routine training, skills in maneuver are mastered and certain tactical doctrine is emphasized. In complicated conditions, the pilot cannot be restricted by receiving commands only from the CP. He must constantly be aware of the whole situation and be ready to destroy the enemy at his own initiative, at any time. "To be first to detect the enemy, with or without the help of the CP, to be able to forestall him in maneuver, and to perform it under the most strenuous physical conditions is itself precondition for victory."<sup>65</sup>

When discussing the supremacy of speed over altitude in maneuvers, the Soviets see a combination of both as a necessity for successful kill, but speed reigns supreme. Each stage of combat requires its own tactics and formations. A variety of formations has made it possible to effectively combine fire and maneuver even with supersonic fighters. The Soviets perceive that the battle formations used during the war are still valid. But the tactics themselves are changing and evolving with the introduction of new and better aircraft.

## RESOURCES

In the last decade the frontal aviation forces have increased drastically in size and quality of assets. The inventory contains approximately 4650 combat aircraft, excluding helicopter gunships which only recently have gained favor with the Soviets. The older MIG 21 Fishbed remains the most numerous (1450) but several newer models have entered the inventory as replacements. Most of the aircraft are dual or multi-role, capable of supporting the ground troops by ground attack or combating other aircraft in the aerial combat/interceptor role.

Composition of frontal aviation resources is as follows:<sup>66</sup>

<u>AIRCRAFT</u>	<u>NUMBER</u>	<u>PURPOSE</u>
MIG-17 Fresco	40	Ground Attack
MIG-21 Fishbed	1450	Air Combat, Ground Attack
MIG-23/27 Flogger	1300	Air Combat, Ground Attack
SU-7 Fitter A	260	Ground Attack/Close Air Support
SU-17 Fitter C/D	530	Air Combat, Ground Attack
SU-19 Fencer	190	Ground Attack
YAK-28 Brewer	120	Ground Attack
MIG-21 Fishbed H	300	Reconnaissance
MIG-25 Foxbat B/D	150	Reconnaissance
IL-28 Beagle	250	Reconnaissance
YAK-28 Brewer E	60	Electronic Warfare
AN-12 Cub	6	Electronic Warfare

## HELICOPTERS

MI-8 Hip	150	Air Assault, Ground Support
MI-24 Hind	310	Air Assault, Ground Support

Qualitative and quantitative change has been the norm within the frontal aviation organization during the last decade. It has been estimated that the overall holdings have increased by over a third, and that the aircraft added to the inventory are more sophisticated and more costly.<sup>67</sup>

The mainstay of the tactical air force is the MIG-21 Fishbed but it is rapidly being replaced by the MIG-23 Flogger. The air combat interceptor is designed to augment the air defense resources organic to the ground division. It is foreseen that the MIG-23 will provide the local air superiority necessary for the tactical deployment of the helicopter gunships in close air support/ground attack role.<sup>68</sup>

The MIG-27 Flogger D provides a major increase in the range and payload capability of a strike aircraft. It has the capability of carrying nuclear weapons and also has effective low-altitude capabilities. It carries the AS-7 Kerry air-to-surface missile used for standoff ground attack.<sup>69</sup>

The SU-17 Fitter is replacing the SU-7 in the ground attack/close air support role pending the introduction of a new close air support aircraft currently under development.<sup>70</sup>

The MIG-25 Foxbat is a high performance air combat/interceptor and reconnaissance aircraft. The model is equipped with the AA-6 air-to-air missile. Side-looking

airborne radar is found on the reconnaissance version.<sup>71</sup>

The MI-24 Hind helicopter has been deployed in increasing numbers. The Soviets have recently introduced the helicopter into both the close air support and anti-tank role. The Hind is the mainstay of this developing force. It uses an infrared sensor for detection of vehicles and is armed with a 4-barrel 23 mm gun, Swatter antitank missile, rocket pods, and bombs.<sup>72</sup> Helicopters are also gaining favor in transporting troops on the battlefield. The Soviets have been hesitant to deploy the helicopter in close air support in a transport role due to their high vulnerability, but the successful American use in Southeast Asia has forced them to reevaluate its use.

### TRENDS AND DEVELOPMENTS

In Military Strategy, the military theoretician Marshal Sokolovskiy projected the development of air power during the 1970's and beyond.<sup>73</sup> The long-range bomber force has become vulnerable. Deep targets are better neutralized by the Strategic Rocket Forces. A considerable portion of frontal aviation missions are being given to tactical missiles found within the ground force organization (FROG, Scud, Scaleboard). But Sokolovskiy conceded that arming fighter bombers with missiles enables them to operate successfully, especially when they are supporting ground forces. In zones of weak air defense, the destruction of moving targets is best accomplished by aircraft. He saw Frontal Aviation as especially effective in destroying the enemy's means of theater nuclear attack. Sokolovskiy explained that aviation has not exhausted its combat possibilities in war when speaking of aviation developments as a whole. His stress was toward the dominance of nuclear warfare and a heavy dependence on the rocket forces. How can this be translated to the battlefield of the future? Is Frontal Aviation meeting the needs of future Soviet strategy?

In order to appreciate the increases in Frontal Aviation one must first realize where tactical aviation fits in battlefield warfare. The Soviets have devoted a significant amount of study to the methodology of the combined-arms battlefield-- how to best use tanks, infantry combat vehicles, self-propelled artillery, and its tactical air assets, including the helicopter. Battlefield scenarios call for heavy superiority ratios and impressive breakthrough capabilities. Land warfare doctrine relies heavily upon massive artillery fire and multiple rocket launchers to suppress enemy defenses and disrupt his reserves. Enemy nuclear delivery means, airfields, and command and control centers are high priority targets for deep penetration aircraft.<sup>74</sup> Massive amounts of artillery are called for during the breakthrough and exploitation phases. The introduction of the BMP and the T-72 tank are consistent with the notion of a continuous, high-speed offensive with off-road capability. The ground force units have changed organizationally and tactically to accommodate these equipment improvements. The emphasis is now towards a combined-arms battle as the motorized rifle division has more tanks, self-propelled artillery, organic electronic warfare capability, organic air defense weapons, and better mobility characteristics.

Frontal Aviation is undergoing a change of doctrine to fit the change in ground force doctrine. It is actually a revision back to earlier doctrine.<sup>75</sup> The measures taken to reduce ground force vulnerabilities have enabled Frontal Aviation to exploit its high performance aircraft capabilities. The changing role of artillery, the growth of organic air defense weapons in the motorized rifle division and changing ground force tactics from a highly concentrated breakthrough to numerous meeting engagements along a wide front have all necessitated reevaluation of the role of Frontal Aviation. With the continuous movement along a wide front, artillery doctrine has shifted more to time sensitive targeting rather than pre-planned saturation. Deep penetration and ground attack strikes have been reassigned to Frontal Aviation from artillery and rocket forces. Also the introduction of the helicopter for close air support and antitank fire was necessitated by changes in ground tactics. The emphasis on the meeting engagement has caused frontal aviation aircraft to deploy heavier payloads and have longer range capabilities. A protracted non-nuclear war, an idea now accepted by the Soviets, shifts some of the roles assigned to tactical missiles back to the fighter pilots. Neutralization of enemy aircraft and means of nuclear delivery are shifted back to aviation.

With the introduction of new generation aircraft in significant numbers frontal aviation forces are and continue to be an effective force. Support to the ground forces continues to be its primary mission. With the changing role of the ground forces, Frontal Aviation has more than kept pace.

## CONCLUSIONS

The frontal aviation assets, although administratively a part of the Air Force, belong to the ground force commander. Operational control of Frontal Aviation allows the front commander to ultimately decide how the air assets will be utilized. With recent trends in ground force doctrine toward a highly mobile series of meeting engagements, the role of Frontal Aviation has renewed importance. The air space must be free of enemy aircraft in order for the ground forces to accomplish their assigned missions. Frontal Aviation is well equipped to perform this role of air superiority with an impressive number of fighter-interceptors. The initial role of Frontal Aviation must be to gain and maintain air superiority. Once the battle begins, with air superiority a reality, the primary role shifts to that of ground support. Support is rendered by air strikes in the forward areas by ground attack aircraft. These strikes are envisioned to destroy the enemy's reserves, cripple force concentrations, and destroy his nuclear delivery means. As the battle progresses aircraft will be assigned to directly support the troops in the close air support role. The function here is to attack every target that was not neutralized with the preparatory artillery fires.

Organizationally the frontal aviation forces are custom made for the supported district or front. The tactical air army is flexible in its structure and resources. It is controlled by the person who needs it, the front commander. A command and control problem does exist as to how the aircraft is controlled once it is in the air. There is no permanent air liaison officer down at the battalion or regimental level who can direct the aircraft in for close air support missions. The other roles that Frontal Aviation is responsible for do not require this precise coordination between the ground troops and the pilots. Utilizing open source critiques of training exercises involving close air support, it has been noted that this lack of coordination is a real problem. Rather than trying to establish an impromptu communication system, both the ground commander and the pilots appear to be satisfied to leave well enough alone and continue only with the pre-planned portions. It is difficult to imagine that the Soviets would allow this to continue in actual hostilities. A forward air controller (FAC), like the American FAC, could easily be implemented and probably will, if he hasn't already, when the Soviets feel a crunch in a real situation.

The training of the Soviet pilot is extensive and continuous. He is either flying a simulator, walking around a sandbox with plastic airplanes in his hands, or listening to veterans tell war stories. In actuality, the pilots are provided with an excellent self-oriented plan of instruction. There is a close relationship between combat readiness and the training posture. The aviation unit commander must be constantly combat ready, even in training conditions. The peacetime test of this readiness and the effectiveness of combined arms training is the tactical training exercise. The open press generally praises the combined efforts of the air-ground team. However, faults were exhibited in a few "case studied" units. There is a lack of coordination between the ground units being supported and the fighter pilots. If the battle situation is different than the pilot's perception at the pre-flight briefing, he is left without direction as to what to do. Several accounts emphasized that neither the air nor the ground personnel knew the capabilities and limitations of his counterpart. Also, there appeared to be a constant criticism of the inflexibility of pre-planned missions. If the ground battle changed from the script, air missions were scrubbed. If there was the above-mentioned FAC link they could be diverted and still provide excellent support.

The resources of Frontal Aviation are considered to be excellent. Air units are being upgraded with multi-role sophisticated aircraft. The quality of the pilot, support crew, and control party appears to be satisfactory in regards to meeting their training objectives. Frustration must exist due to the inflexibility of the training scenarios. Staged exercises either go well, if all goes according to plan, or else everyone goes home without mission success if something went amiss. The true test, however, is actual combat. The training can serve as a lesson in peacetime but no bars will be held in a war posture.

Tactics change according to the change of resources and ground doctrine. The Dubrov discussion illustrates that the Soviets desire to change from tradition with new developments, such as the use of the helicopter, but they will stick with some of their well-proven tactics, such as group formations which are still critical to Soviet aerial combat doctrinal thought. Here they disagreed with the American experience in Southeast Asia in favor of the lessons of the Great Patriotic War, but the concept of how to fight the ground battle is changing and air tactics must also.

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